**Shigella + Listeria**

Bacteria → GM- → Rod → Shigella

**Shigella (divergent from E. coli)**

* 4 species distinguished by O-antigen
  + S. dysenteriae – serogroup A (most serious)
  + S. flexneri – serogroup B
  + S. boydii – serogroup C
  + S. sonnei – serogroup D (least serious)
* Epidemiology
  + 10x more likely in children | Mostly in developing countries
  + Person-person contact | Transmitted via food + water
* Pathophysiology

1. Approach mucosal surface by diffusion (b/c nonmotile)
2. Shigella enters M (microfold cells) – cannot invade normal endothelial cells from apical side
3. Pass thru M-cell + released into lamina propria
4. Some ingested by macrophage → Release IL-1 → ↑host immune response
   1. Inflammatory response loosens tight jxns → allows shigella to penetrate epithelium
5. Others bind to basal epithelial surface via α5β1 integrin
   1. Shigella invasion → induces phagocytosis
   2. Shigella hemolysin → lyses phagosomal vesicle releasing bacteria into cytoplasm
6. Uses actin-based motility to spread to adj. cells
7. Ulcer forms once sig # epithelial cells are sloughed off
8. Neutrophils also accumulate in large numbers in mucosa + shed into blood
   1. Results in dysentery

* Symptoms
  + Dysentery – frequent passage of stools w/ small amts of blood, mucous, pus | Bowel Pain
  + May have bacteremia if S. dysenteriae type 1 ← due to Shiga toxin
    - In 40% of children → severe shigellosis, neuro syms
* Shiga Toxin
  + Cytotoxin that kills intestinal epithelial + endothelial cells → contribute to bloody diarrhea
  + Irreversibly inactivates the mammalian 60S ribosome → stops protein synthesis → may trigger apoptosis
  + Also targets villus cells → ↓ Na+ adsorption + excess water in lumen
* Diagnosis
  + Culture with fresh feces + sample
  + Serotype for rapid presumptive diagnosis
* Treatment
  + ANtiobiotics to reduce severity, duration, + infectivity
  + Need to be wary of rapid antiobiotic resistance
  + DOC – FQs (contra if <17yrs old)
  + New β-lactams | Cephalosporins available
  + NO vaccine

Bacteria → Gm+ → Rod → Listeria

**Listeria monocytogenes**

* Sym: Septicemia (m – 50%) | Meningitis/Encephalitis (m – 70%) | Corneal Ulcer | Pneumonia
* Intrauterine/Cervical Infection (m – 80%)
  + Bacteria can cross endothelial later of placenta
    - Spontaneous abortion or stillbirth
    - Granulomatosis infantiseptica – pyogenic granulomas
* Pathogenesis

1. Invasin induces host cell to take up bacteria
2. Bacteria escapes phagosome into cytoplasm via hemolysin
3. Bacteria multiple + infect adj. cells via actin-polymerization
4. Bacteria released
5. Use peptido-glycan N-deacetylation to evade host immune system
   1. Unmodified disaccharides recognized by lysosomes, TLR2, Nod

* Diagnosis
  + Microscopy: short, Gm- chains
  + Culture – grows @ 4° C | in high salt | over wide range of pH
  + Cell properties – weakly hemolytic | motile @ room temp
* Epidemiology
  + Ubiquitous
  + Transmission by food poisoning
  + Risk factors: Age Extremes | Pregnancy | Immunosuppressed
* T: β-lactams + aminoglycosides
* Pre: Avoid raw/partially-uncooked meats